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EXAMINATION OF STATISTICS AND REVIEW OF THE CURRENT MARKET SITUATION AND MEDIUM AND LONG-TERM OUTLOOK

Review of the current market situation and medium and long-term outlook

Report by the UNCTAD secretariat

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I. SUMMARY AND CONCLUSIONS

1. The world tungsten market continued to be characterized by poor conditions in 1993. Consumption of ores and concentrates was estimated at 32,697 metric tons, down by 10.7 per cent from 1992, which was the fourth consecutive fall since 1989. In the four years 1990-1993, world consumption of ores and concentrates fell by 43.7 per cent. The closure of domestic mines and the increased availability of imported intermediate products have continued to reduce demand for ores and concentrates in major consuming countries, and this shrinking market has also experienced increased price instability. In a tighter market, the entry or exit of major buyers and distress sales by small suppliers have major effects on prices.

2. In comparison with many other minerals and metals, the closure of mines has been most drastic in the tungsten industry. Successive production cutbacks reduced estimated world mine production from a peak of 60,426 metric tons in 1989 to 30,286 metric tons in 1993 (metal content). Production has fallen to less than 9 per cent and 20 per cent of its level at the beginning of the 1980s in developed market economy countries and developing countries respectively. Mine closures have continued despite the fact that mine production has recently fallen short of consumption.

3. The recent mine closures have also affected the major tungsten-producing provinces in China. Chinese production was estimated at less than 20,000 metric tons in 1993, compared to over 40,000 metric tons at the end of the 1980s. Despite recent closures, China is still the dominant producing country, accounting for about two-thirds of world production.

4. The tungsten market in 1993 still abounded with supplies coming from stocks, including material held in stock in China, market-economy-country warehouses and the Commonwealth of Independent States. Nearly 60 per cent of the tungsten in concentrate consumed worldwide in market-economy countries is believed to be currently derived from stocks. At the end of 1993, reported commercial stocks, which represent only a small fraction of total stocks, amounted to an estimated 4,008 metric tons, showing a total drawdown of 20.8 per cent over the year.

5. Imports of ores and concentrates fell by 48.3 per cent to 3,287 metric tons in 1993, while exports fell by 48.7 per cent to 3,285 metric tons. Tungsten requirements of importing countries are now largely met by imported intermediate products.

6. The competitive offer of intermediate products continued to depress tungsten prices and contributed to the overlapping of ammonium paratungstate (APT) prices with the upper part of the concentrate price range. The cost saving made by a buyer from one metric ton unit of tungsten if he bought ammonium paratungstate instead of tungsten concentrates was estimated at about US$ 20 per m.t.u. at the beginning of 1993. The saving in cost was also substantial in the case of ferro-tungsten. The sharp fall of intermediate product prices such as APT and ferro-tungsten dragged down the prices of other tungsten materials.

7. The anti-dumping duties adopted by the European Union and the United States affect imports of Chinese concentrates. China has recently adopted a series of policy changes, including the elimination of price subsidies, the introduction of value-added taxes, the deregulation of the domestic energy market and the pursuit of market-oriented reform. These developments have begun to have effects on mine production in China, and supply could greatly decrease

as stocks dry up. However, supply from the Russian Federation could increase, although the amounts involved have so far remained limited.

8. The tungsten market may be entering a new phase. The recent capacity closures have led to a deficit between mine production and tungsten consumption, which has been made good by stock drawdowns, mostly from unreported stocks. Provided the recovery of the world economy strengthens as foreseen in most recent forecasts, the market is expected to face a tighter supply situation as tungsten stocks dry up and Chinese supply becomes more market-oriented. In an increasingly vulnerable market, it is not precluded that the market may face serious instability in the event of a sharp recovery in world tungsten consumption.

II. DEVELOPMENTS IN TUNGSTEN DEMAND

A. World economic situation

9. Some early forecasts pointed to a substantial world economic recovery in 1993 from the recession of 1991-1992. In the event, the world economy achieved a growth rate of only 1.5 per cent in 1993 (annex I), less than anticipated.[1] This was mainly as a result of persistent recession in many major economies, including France, Japan and Germany, and the continued sharp fall of industrial production in countries of central and Eastern Europe. However, the poorer performance in these countries was largely offset by stronger growth in the United States, particularly towards the end of the year, and some other countries, including western Pacific-Rim countries.

10. At the beginning of 1994, the performance of the United States remained steady, with forecasts expecting growth to attain 3.1 per cent for the year, compared to 3.0 per cent in 1993. The economic outlook also brightened in Western Europe, with the largest economies of the region, France and Germany, experiencing significant upturns, but the outlook remained sluggish in Japan, which is only just emerging from its longest and deepest recession since the Second World war.[2] However, all three economies are set to achieve higher growth rates in 1994 than in 1993.

11. In Central and Eastern Europe, the economic situation seems to be improving in some of the countries, but recent forecasts indicated that the tight financial policy in the Russian Federation would cause a further substantial fall in production in 1994. In western Pacific-Rim and southern Asian countries, including Australia, China, India, the Republic of Korea, Malaysia, the Philippines and Taiwan Province of China, economic performance remains significantly above world average.

12. As a whole, the world economy is generally expected to grow betweeen 3.0 and 3.5 per cent in 1994. Such a level of world economic growth has in the past been associated with strong demand for tungsten.

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[1] For example, the world economy grew by less than anticipated by OECD (Mining Journal, 30 December 1993, page 325).

[2] See "Japan rejects IMF growth pessimism", Financial Times, 22 April 1994, page 5.

B. Demand for tungsten

13. In 1993, world demand for tungsten measured by consumption of ores and concentrates was estimated at 32,697 metric tons (annex II), down by 10.7 per cent and following on from decreases of 10.5 per cent in 1992, 17.4 per cent in 1991 and 14.6 per cent in 1990. The closure of most domestic mines in consuming countries and the increased availability of imported intermediate products have sharply reduced consumption of ores and concentrates in recent years. Few major consuming countries still convert ores and concentrates into intermediate products for their tungsten requirements. In Western Europe, there are only three APT producers left, namely Hermann C. Starck (Germany), Secotools (Sweden) and Wolfram-Bergbau (Austria), and their consumption of ores and concentrates has been in decline. The number of producers in Japan and the United States has also greatly decreased.

14. Developed market-economy-country consumption of ores and concentrates fell to 5,857 metric tons in 1993, down by 21.8 per cent from 1992, after a decrease of 27.6 per cent in 1992. With the increasing preference for imported intermediate products, the only large concentrate consumer left among developed market-economy countries is the United States, which accounted for nearly 70 per cent of developed market-economy-country consumption in 1993. Despite improved tungsten activity[3] in the United States, consumption of ores and concentrates fell to an estimated 4,000 metric tons, down by 7.3 per cent compared to 1992. Consumption was down by 53.3 per cent to an estimated 700 metric tons in Austria, as its only tungsten mine was forced to shut down during the year. Decreases also occurred in Japan and Sweden, where consumption was down by 4.6 per cent to 850 metric tons and by 63.6 per cent to 95 metric tons respectively.

15. Notwithstanding the improved economic performance of Asian and Latin American countries, developing-country consumption of tungsten ores and concentrates has also been declining. Demand for tungsten is mostly in the form of imported finished or semi-finished products such as carbide tools and lamp filaments. In 1993, developing-country consumption of ores and concentrates was estimated at 530 metric tons, down by 71.0 per cent, following on from the decreases of 13.6 per cent in 1990, 15.5 per cent in 1991 and 15.6 per cent in 1992. Demand has fallen particularly sharply in the Republic of Korea, which is by far the largest consuming developing country. Its consumption of ores and concentrates shrank by 85.7 per cent to 200 metric tons in 1993.

16. Consumption of ores and concentrates in China may be broadly divided into two types, namely material consumed domestically and material converted into intermediate products for export. While consumption of the first type has been virtually constant, that of the second type has increased tremendously. Between 1980 and 1991, China's domestic tungsten consumption increased at an average of only 0.7 per cent per annum and is currently estimated at a level of 10,000

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[3] As referred to by the United States Bureau of Mines, United States industrial tungsten activity is based upon net production of intermediate tungsten products, including metal powder and tungsten carbide powder produced from hydrogen reduced metal powder. This activity rose by about 12 per cent in 1993 (see Mineral Industry Surveys, Tungsten in December 1993, United States Bureau of Mines, March 1994).

metric tons.[4] However, Chinese domestic consumption has experienced substantial structural changes. From 1980 to 1985, China's tungsten consumption in steel and cemented carbide accounted for 61 per cent and 28 per cent respectively. From 1986 to 1991, the percentage for steel dropped to 47 per cent, while for cemented carbide it rose to 40 per cent.

17. Furthermore, the recent growth in the Chinese economy has taken place in sectors which have not led to substantial growth in tungsten consumption, such as the semiconductor industry and office automation equipment. In some areas of application, the quality requirement is so high that consumption has to depend on imports. Another interesting aspect about Chinese consumption is that substitution of tungsten by other materials, including molybdenum, is not significant. Neither ceramic alloys nor coated cemented carbides have come into wide use either.

18. In 1993, total Chinese consumption of ores and concentrates was estimated to have fallen to below 20,000 metric tons, compared to an estimated 25,000 metric tons in 1989. It was made up about half by material consumed domestically and the rest by material converted into intermediate products for exports. Given that Chinese domestic consumption will continue to grow, although at a moderate pace, the production cutbacks reported recently are likely to reduce exports rather than the domestic supply of tungsten products.

19. In Central and Eastern Europe and Commonwealth of Independent States (CIS) countries, consumption of ores and concentrates is still affected by the sharp drop in industrial activity in sectors such as oil drilling, mining, metal products and defence industries. It has been estimated that to gross domestic product in these countries declined by over 43 per cent in the three years between 1990 and 1992. Although the situation in 1993 showed greater economic stability in such countries as to Czech Republic, Hungary, Poland and Slovenia, the decline was reported to have continued in the Russian Federation and other members of the Commonwealth of Independent States, where national output plunged by another 13 per cent in 1993. Their consumption of ores and concentrates was estimated at 6,000 metric tons, compared to 12,000 metric tons in 1989.

III. DEVELOPMENTS IN TUNGSTEN SUPPLY

20. Supply of tungsten from mine operations is at its lowest ever since the 1960s, leading recently to a market deficit, as mine production has been falling short of tungsten consumption. While a supply crunch still looks remote as abundant material continues to be held in stocks, many in the tungsten market believe that the time of abundance of cheap supply may be coming to an end.[5]

A. World supply of tungsten

1. World mine production

21. Mine operations have recently shrunk tremendously. In 1993, world mine production was estimated at 30,286 metric tons (annex II), down by 12.0 per cent

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[4] Zhao Wuzhang et al., "Tungsten production and consumption in China", paper presented at the Sixth International Tungsten Symposium, 2-4 November 1993, Guangzhou, China.

[5] Refer to "Chinese tungsten tightens up at last", Metal Bulletin, 17 January 1994, page 11.

after decreases of 8.7 per cent in 1992, 22.9 per cent in 1991 and 19.1 per cent in 1990. The four successive falls reduced production of ores and concentrates virtually by half from the peak of 60,426 metric tons in 1989. Although many other mineral sectors have equally suffered from mine closures recently, the situation seems to be most drastic in the case of tungsten.

22. Production of ores and concentrates in developed market-economy countries was estimated at 1,199 metric tons in 1993, down by 62.9 per cent following a modest rise of 8.2 per cent in 1992. Capacity closures in these countries have reduced their mine production to less than 9.0 per cent of the level at the beginning of the 1980s. Production cutbacks started in those producing countries most dependent on export outlets and spread gradually even to producing countries with a significant domestic market, such as Austria, which was forced to close down its Mittersill mine in 1993. Even the Panasqueira mine in Portugal, the largest tungsten mine still in operation in Western Europe, was recently forced to reduce production. It was reported that it would be completely closed down by the end of 1993.

23. Developing countries have also seriously suffered from mine closure. In 1993, developing-country mine production was estimated at 1,737 metric tons, down by 38.3 per cent and following on from decreases of 30.3 per cent in 1992, 6.2 per cent in 1991 and 21.4 per cent in 1990. There are very few substantial mines still in operation in developing countries. The Republic of Korea, which used to be the largest producer among the developing countries, closed its Sang Dong mine in mid-1992, and no production was reported for 1993. Production was also seriously affected in Latin American countries, of which Bolivia and Peru were the more important producing countries. In 1993, concentrate production in these latter two countries fell to 262 metric tons and an estimated 600 metric tons respectively, down by 69.2 per cent and 7.7 per cent respectively from the previous year.

24. Mine production has experienced difficulties in Central and Eastern European countries too, following sharp drops in domestic consumption. In 1993, it was estimated at 5,750 metric tons, with most of the material originating from the Russian Federation. Although it accounts for less than half of the proven reserves of the CIS, the Russian Federation produces about 85 per cent of CIS ores and concentrates, estimated at 5,000 metric tons in 1993. On the other hand, Kazakhstan is currently credited with less than 5 per cent of CIS mine production or less than 300 metric tons, although it accounts for 53 per cent of the CIS proven reserves.[6] Because of the remoteness of the reserves and the lack of supportive infrastructure and capital resources, Kazakh tungsten deposits seem to be underexploited. The CIS has two other relatively minor producers, namely Tajikistan and Uzbekistan, where mine production is estimated at 200 metric tons each.

2. Mine production in China

25. Mine production in China expanded rapidly in the 1980s, reaching the all-time record of an estimated 41,000 metric tons[7] in 1989. Since then the level of production has been falling in the face of declining demand in the export

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[6] See "Kazakhstan country supplement", Mining Journal, London, 11 March 1994, page 2.

[7] Estimated on the basis of China's domestic consumption plus its exports of ores and concentrates and intermediate products.

market, anti-dumping legislation enacted by some consuming countries, extremely weak market prices, and the impact of economic reform policies implemented by China to reduce subsidies[8] or credit availability for financing state enterprises.

26. Despite losses in many mines, the question of their closure has given rise to major social concerns, particularly in areas where mining activity is often the main source of employment. Many of the mines would have long been closed down if the decision to close were based not on social factors but solely on market forces. The recently closed down mines include Pangushan, which had a capacity of 2,500 metric tons. Its production was phased out by 1,000 metric tons per year from 1991, until it was reported closed down in 1993. The Shanhu mine was also reported to be closed down, like all other tungsten mines in Guangdong Province, which was better able to deal with the social problems arising from mine closures given the economic boom experienced by the Province since the introduction of the social market-economy system.

27. The largest tungsten-producing area in China, Jiangxi Province, was also severely affected by mine closures. Its two largest mines, Dajishan and Xihuashan, with a capacity of 3,000 metric tons each, were reported to have sharply reduced production. Recent estimates put total Chinese mine production in 1993 at below 20,000 metric tons. Despite the recent production cutbacks, China nevertheless remains the dominant tungsten-producing country, still accounting for almost two-thirds of world mine production.

B. Stock movements

28. The sharp production cutbacks have led to a shortfall of mine production in relation to consumption, which has been largely made up by drawdowns of stock material. Recent estimates indicate that nearly 60 per cent of the tungsten consumed in concentrates is believed to be derived from stocks, most of which were unreported.[9]

29. In 1993, reported commercial stocks of ores and concentrates (producers', consumers' and traders' stocks) held in reporting countries amounted to 4,008 metric tons (annex III), down by 19.2 per cent after the decreases of 14.8 per cent in 1992 and 2.5 per cent in 1991. Because of the continued decline in concentrate consumption, the 1993 commercial stocks were equivalent to nearly seven months' consumption of ores and concentrates in market-economy countries in spite of the drawdowns, compared to six months' consumption in 1992.

30. Over 70 per cent of the reported commercial stocks consisted of materials held as 'involuntary' stocks by producers. The unremunerative prices have forced many producers to withhold their tungsten rather than to sell it, which would only cause further deterioration in the market. In 1993, reported producers' stocks amounted to 2,816 metric tons, down by 12.8 per cent. The closure of mine operations has been accompanied by the liquidation of producers' stocks in Japan and Portugal, where such stocks fell by 61.8 per cent and 29.5 per cent respectively. Thailand held over 60 per cent of the reported producers' stocks.

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[8] Refer to "Chinese tungsten output falling", Metal Bulletin, 27 January 1994, page 10.

[9] Mineral Industry Surveys, Tungsten in November 1993, United States Bureau of Mines.

31. In 1993, reported consumers' stocks amounted to 1,192 metric tons, down by 30 per cent following the decrease of 37.7 per cent in 1992. A major explanation for the falling level of concentrates held in consumers' stocks is that primary consumption in major consuming countries largely takes the form of imported intermediate products, which reduces the need for consumers to carry concentrates in stock. Consumers' stocks in the United States rose to 1,778 metric tons in 1991 in anticipation of the enactment of the 151 per cent anti-dumping duties on Chinese concentrates, but they have since dropped sharply, amounting to only 592 metric tons at the end of 1993. No dealers' stocks were reported in 1993.

32. Substantial drawdowns of ores and concentrates were also reported in China recently, although the amount was difficult to quantify due to the lack of statistical information. Chinese stocks are said to have accumulated rapidly in the 1980s, as illustrated, for example, by shipments from Pangushan to the big APT plants since 1990, which have been consistently higher than production[10] and are presumed to come mainly from stocks.

33. Available figures showed that in 1993 APT stocks fell from 420 metric tons to 264 metric tons in Sweden but rose from 333 metric tons to 420 metric tons in the United States. Stocks of intermediate material were also on offer from the Russian Federation, but figures were not reported.

C. Scrap recycling

34. Supply of scrap as a proportion of total tungsten supply is determined by a number of factors, including market demand, the level of prior as well as current consumption and the price relationship between primary tungsten and scrap. It is estimated that recycled scrap accounts on average for 25 per cent of tungsten consumption in Japan, the United States and Western Europe. This proportion can however vary greatly from one consuming country to another and from year to year.[11]

35. With the 151 per cent anti-dumping duties imposed on imported concentrates from China, there has been an increased consumption of scrap in the United States, which has given a boost to imported material. However, demand for tungsten scrap in the market outside the United States has remained depressed. With current low tungsten prices, there is no real economic incentive to buy scrap to recover the tungsten, which still faces a problem of quality in certain applications.

36. Scrap has recently become available at increasingly competitive prices on the international market, which has attracted particularly United States buyers. Pure tungsten scrap, made up of materials such as turnings, sheets and wire is reportedly available from most major consuming countries, which would otherwise have consumed such materials themselves had there been a stronger domestic market. Much of the scrap can be directly added to the melt without much further processing and competes strongly with ferro-tungsten.

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[10] International Tungsten Industry Association (ITIA) Newsletter, December 1993.

[11] It may be noted that a tremendous effort was made during the two World Wars to both collect and recycle tungsten scrap. Recycled material accounted over 40 per cent of total United States consumption of tungsten (see Gerald Smith, Materials Flow of Tungsten in the United States, open file report, United States Bureau of Mines, December 1993).

37. A further major source of tungsten scrap recently has been imports from the Russian Federation. The total shipment of Russian scrap is not known due to lack of comprehensive statistics, but recent reports suggested that substantial amounts were available and that the scrap material came from various sources, including military and electronic applications.[12]

IV. DEVELOPMENTS IN TUNGSTEN TRADE

A. Developments in trade and marketing policy

38. In recent years, the tariff structure in the tungsten market has changed significantly in several aspects. Until quite recently, tungsten in the form of concentrates, like most other raw materials, was imported duty free in most consuming countries. A major recent development has been the imposition of anti-dumping duties in the European Union and the United States on certain Chinese materials. European Union imports of Chinese concentrates, tungstic acid and oxide and tungsten carbide powder are subject to anti-dumping duties of 42.4 per cent, 35.0 per cent and 33.0 per cent respectively. In the United States, Chinese concentrates are subject to an anti-dumping duty of 151 per cent.

39. Besides the anti-dumping duties, import duties are levied at different rates depending on the country of origin and according to whether to the imports qualify for generalized system of preferences (GSP) rates or for most favoured nation (MFN) rates. The GSP grants full exemption from import duties on ammonium paratungstate, tungsten oxide and hydroxide, tungsten carbide, ferro-tungsten, unwrought tungsten, including powder, and tungsten wire in Japan and Sweden and on ammonium paratungstate, tungsten oxide and hydroxide and tungsten wire in European Union countries. In the United States, most tungsten products are eligible for GSP rates. Among the exceptions are tungsten powder and tungsten wire.

40. In most major importing countries, there also exist MFN rates which are generally higher than the GSP rates. Materials which are not granted the GSP or MFN rates are subject to the stiffer non-MFN regime. In the United States, for example, tungsten concentrates, ferro-tungsten, tungsten powder, ammonium paratungstate and tungsten carbide are subject respectively to non-MFN duties of US$ 1.10 per kilo of tungsten content, 35.0 per cent, 58.0 per cent, 49.5 per cent and 55.5 per cent, compared to 37.5 US cents per kilo of tungsten content, 5.6 per cent, 10.5 per cent, 10.0 per cent and 10.5 per cent on an MFN basis.[13]

41. The Russian Federation was recently granted MFN status by the United States Government, thus substantially reducing the cost of importing Russian materials into the United States. This development, together with the anti-dumping duties imposed on Chinese imports, has recently led to greater efforts by Russian producers to launch a tungsten export drive in a bid to capture larger shares of the European and United States markets.[14]

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[12] See 'Tungsten scrap still depressed', Metal Bulletin, 7 February 1994, page 13.

[13] See Mineral Industry Surveys, Tungsten in 1989, Unites States Bureau of Mines, January 1990.

[14] See "Nalchik launches tungsten export drive", Metal Bulletin, 21 April 1994, page 11.

42. As regards policy developments, the pursuit of economic reform and restructuring by China continues to affect trade in minerals and metals, including tungsten. Recent developments include the introduction of value-added taxes (VAT) and the deregulation of the energy market in China, which, like the recent measure to end price subsidies, have made imports from China more expensive. However, efforts to co-ordinate the marketing of Chinese materials do not appear to have led to concrete measures. Initiatives in this direction, which have involved both China National Nonferrous Metals Import and Export Corp. (CCNIEC) and China National Metals and Minerals Import and Export Corp. (MINMETALS), seem to face two major obstacles, namely the increased autonomy of provincial authorities in commercial matters and the difficulty of controlling and defining price levels centrally as China adopts an increasingly market-oriented economic regime.

B. Trade in ores and concentrates

43. World trade in ores and concentrates has continued to shrink since 1988-1989. Weaker market demand and the increasing preference of consumers for imported intermediate products are major factors contributing to the current situation. In addition, world imports of concentrates were also affected by lower demand in countries of Central and Eastern Europe, the availability of upper-market material from stocks held in the former USSR and the 151 per cent anti-dumping duty on Chinese concentrates.

44. In 1993, world imports of ores and concentrates were estimated at 3,287 metric tons, down by 48.3 per cent (annex II). The sharp fall was explained mainly by the drastic drop in United States imports and the complete halt of concentrate imports by the Republic of Korea as the latter country ceased to convert imported concentrates into intermediate products. Notwithstanding economic recovery, United States imports dropped by 30.5 per cent to 1,721 metric tons. The United States is the only major importing country left, accounting for nearly half of total world imports. With its last tungsten mine closing down, Austria bought some shipments to replace domestic supply. Its imports jumped to 309 metric tons from 57 metric tons in 1992.

45. As regards world exports of ores and concentrates, they were down by 48.7 per cent to an estimated 3,285 metric tons in 1993 (annex II). The sharp decrease was due to the drastic export cutbacks of ores and concentrates from China. Its exports were down 70.0 per cent to only 360 metric tons, which was less than Bolivia, Portugal and Peru, although the exports of these countries also fell.

C. Trade in intermediate products

46. Chinese cutbacks in exports of ores and concentrates were made up by exports of intermediate products. It was estimated that China exported 12,000 metric tons in different tungsten products in 1993, up by about 30 per cent compared with 1992. Most of these products consisted of ammonium paratungstate, sodium tungstate, tungsten oxide and hydroxide, and ferro-tungsten. Shipments were reported to have come in large part from stocks inside China, and some of the material recently exported by the latter country was believed to have been re-stocked in warehouses in market-economy countries.

47. The increase in Chinese exports in 1993 arose mainly from shipments to the United States. Imports of tungsten products, including tungsten scrap, by the latter country rose sharply in 1993, largely because of the strong performance of the domestic economy and the further reduction in the consumption of ores and

concentrates. Total United States imports amounted to 5,619 metric tons, compared to 4,163 metric tons in 1992. Of these imports, Chinese materials amounted to 2,958 metric tons, up by 83.7 per cent compared with the previous year. Most of the increase was due to imports of materials defined as "other".[15] Imports of Chinese ammonium paratungstate increased to 907 metric tons from 303 metric tons and ferro-tungsten to 487 metric tons from 312 metric tons.

48. Chinese producers are reported to be facing an increasingly difficult market situation. On the one hand, they have recently seen an erosion of their earnings as prices collapsed, while on the other their costs have increased by 20-30 per cent through new taxes as a result of fiscal changes and by a further 10 per cent through the loss of their export subsidy.[16] It remains to be seen how these measures will affect the supply of Chinese tungsten for exports.

49. With the sharp cutback in tungsten consumption, some tungsten products from the Commonwealth of Independent States, chiefly of Russian origin, were offered on the international market. However, the amounts have remained inadequately reported and are mostly assumed to have come from stocks. The Russian Federation is presumed to have inherited most of the strategic stockpile of the former USSR In the first half of 1993, total Russian exports were reported to amount to some 150 metric tons of tungsten oxide and 10 metric tons of ferro-tungsten, while no exports of scrap were recorded. There was no comprehensive information on the second half of the year, but it would seem that there was an increase in the volume of exports. Total imports of Russian tungsten oxide by the United States amounted to 300 metric tons in 1993. Given the relatively limited amounts exported, the Russian Federation has yet to become a major exporter on the international scene. However, any substantial run-up in prices could significantly change the picture.

V. PRICE DEVELOPMENTS IN THE TUNGSTEN MARKET

A. Performance of tungsten prices

50. The price performance of tungsten has been one of the worst among minerals and metals: prices have never been lower since the mid-1960s. The tungsten market has known periods of depressed prices before, but the decline has seldom been more pernicious in terms of mine and plant shutdowns.

51. The extremely weak price conditions prevailing in the tungsten market are due to the combined effect of a number of factors. These factors include the persistent recession in industry, the abundance of supply from stocks, unabated competition among producers in the face of reduced market offtake, and the availability of some intermediate product grades at concentrate prices. The reduced military demand for tungsten as a result of the end of East-West confrontation has added further downward pressure on tungsten prices. Structural and technological changes in industry adopted during the period of high tungsten prices to economise on the use of tungsten still influence tungsten demand, although their negative effects have since been at least partly reversed.

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[15] These materials include calcium, potassium and sodium tungstates, mixtures and materials in chief value tungsten, tungsten oxide, tungstic acid, unwrought ingots and shot, other unwrought tungsten and materials, wrought tungsten, and other tungsten compounds.

[16] See "Chinese taxes push up tungsten prices", Metal Bulletin, 21 February 1994, page 10.

52. As shown in figure 1, the evolution of tungsten prices may be divided into two distinctive periods. Before 1977, tungsten prices tended generally to move upward. There was a substantial price fall at around the time of the first oil crisis between 1972 and 1973, but it was much less severe than the recent steep price decreases. The weak prices in the early 1970s were followed by sharp increases in tungsten prices fuelled by strong demand in major consuming sectors, including metal products, heavy manufacturing, petroleum and gas, and mining.

53. The unprecedentedly high price level in the late 1970s proved unsustainable, however, in the more unfavourable economic climate of the 1980s. In the face of deteriorating demand conditions and abundant supply of materials, the tungsten market virtually collapsed in the period between 1981 and 1986, and tungsten prices seem still to be suffering from this collapse. Unlike many other mineral and metal markets, the substantial economic upturn in 1987-1989 produced only limited price improvements for tungsten, which were followed by a further deterioration that brought tungsten prices to their current low levels.

54. The unprecedented period of depressed prices in recent years leads to the question as to how long the price of tungsten could remain at its current low level before the next period of price increases begins. Prices have fallen so low and stayed depressed for so long and mine operations have been so depleted as a result of mine closures that the market may face the prospect of serious shortages in the event of anticipated increases in world tungsten consumption.

B. Prices of ores and concentrates

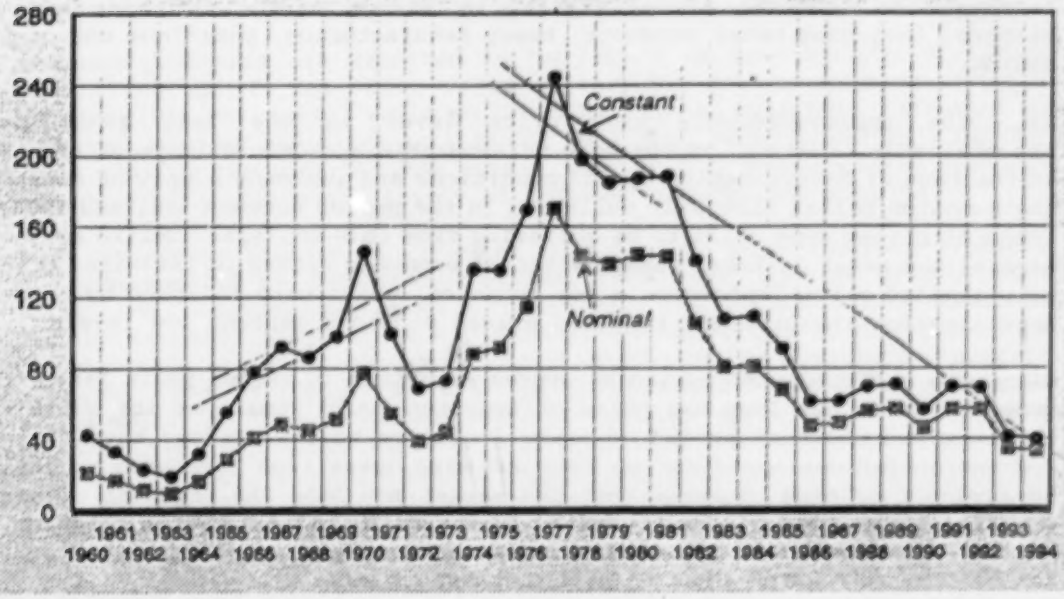
55. As the market for ores and concentrates shrinks in size, it has become increasingly unstable on account of fluctuations in market offtake. The exit or entry of major buyers, as well as distress sales by small suppliers, seemed sufficient to produce major effects on market prices. The average annual price of ores and concentrates in 1993 was US$ 34 per m.t.u., down by 40 per cent compared to 1992. Although demand was firmer as the market started 1994, the price of ores and concentrates showed signs of only slight improvements.

56. In 1991, the announcement made early in the year by China suspending exports of ores and concentrates and the buying underpinning demand in the United States in anticipation of the 151 per cent anti-dumping duty led to an upturn of concentrate prices. The tungsten market ended 1991 with ores and concentrates traded between US$ 59 and US$ 67 per m.t.u., compared to between US$ 37 and US$ 47 per m.t.u. during the corresponding period a year earlier.

57. However, the 1991 improvement was unsustainable, and concentrate prices began to weaken again as the market plunged into further recession in 1992. The continued recession in industry and the consumer preference for imported intermediate products led to a sharp decrease in the market offtake of ores and concentrates. The offer of even limited parcels of tungsten materials had a substantial impact on concentrate prices. Withholding purchases before striking a bargain also had similar consequences and drove down concentrates prices. Prices slid for most of the year. By the end of 1992, concentrate prices were down to the level of two years before.

58. The market entered 1993 with concentrate prices quoted by Metal Bulletin between US$ 40 and US$ 50 per m.t.u. With demand improvement looking remote and market offtake stagnating further, concentrate prices began to crumble despite supply cutbacks and mine closures in China and other countries. The market effects of the mine closures were largely neutralized by the belief in the

Figure 1
PRICE OF ORES AND CONCENTRATES*
1960 - 1993



Source: Metal Bulletin

* Average MB mid-range ($/mtu Wo3)

Note: Constant 1960 dollars (current dollars divided by the United Nations index export unit value of manufactured goods exported by developed market-economy countries)

market that there was abundant material in immense stocks accumulated through years of cost subsidization.

59. Tungsten ores and concentrates were traded between US$ 32 and US$ 43 per m.t.u. by the end of the first quarter of 1993. Accelerated falls brought prices of ores and concentrates down to US$ 27 - US$ 39 per m.t.u. and to US$ 21 - US$ 34 per m.t.u. respectively by the end of the second and third quarters of 1993. Within a period of nine months, prices had fallen by 48.5 per cent for lower-grade and by 32.0 per cent for higher-grade materials. The material had not been traded at such low prices since the 1960s.

60. Despite distress sales by some small suppliers, the market began to bottom out towards the end of the year, particularly for higher-grade material. There was an increase in buying interest, largely generated by purchases in the United States as a result of strengthened performance of its economy. However, the turnaround was limited as the market was still flooded with a considerable amount of tungsten materials. Tungsten ores and concentrates were traded between US$ 27 and US$ 39 per m.t.u. at the end of 1993.

61. The price of ores and concentrates stayed unchanged at the above level as the market started 1994. Although the prices of other tungsten materials became firmer, this effect was not felt in the concentrate market until towards the end of the first quarter, when prices began to move upwards to US$ 28-41 per m.t.u. and then to US$ 28-43 per m.t.u., with the high grades commanding an increasingly larger premium. The higher premium succeeded in pulling along the price of the lower-grade material. At the time of writing, concentrate prices were quoted at US$ 33-45 per m.t.u.

C. Prices of intermediate products

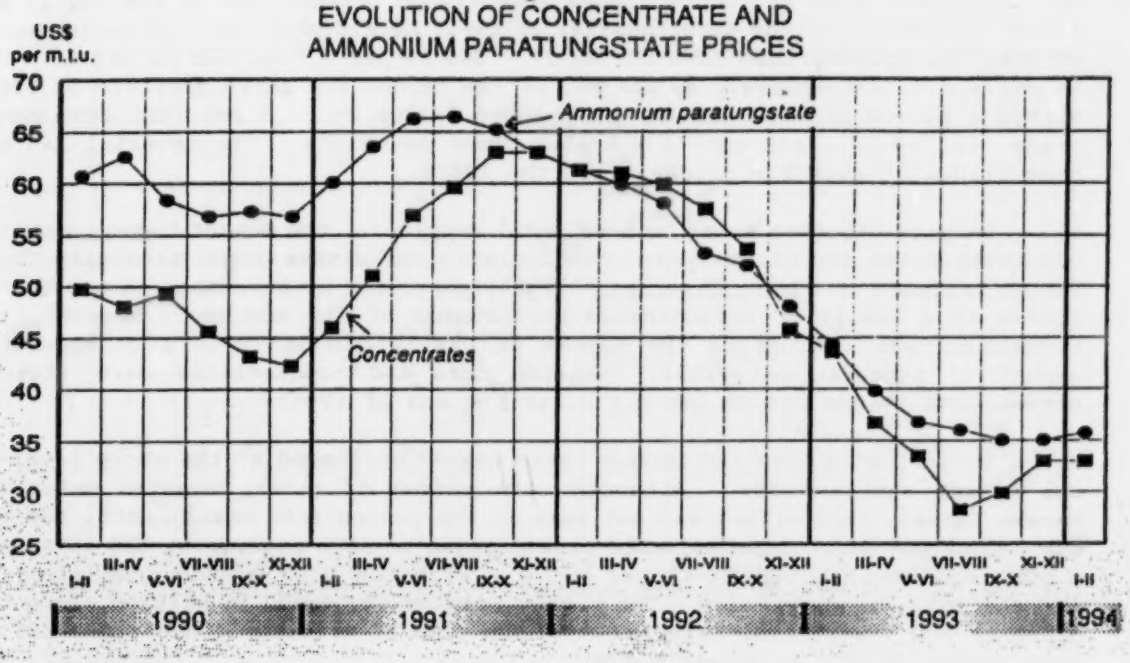
62. In the past, when cheap imported intermediate products were not as readily available as they are today and their trade consisted mainly of flows between developed market-economy countries, the price of concentrates determined price conditions in the tungsten market. At present, with imports of intermediate products accounting for the larger part of supply of tungsten in the major consuming countries, including European Union countries, Japan and the United States, the prices at which these products are available strongly determine price conditions in the tungsten market.

63. Owing to current economic and structural factors, prices of tungsten products may show quite different patterns of behaviour in Western Europe and the United States. In 1992 and 1993, whereas APT prices fell successively by 11.4 per cent and 31.7 per cent to an annual average of US$ 37.93 per m.t.u. in Western Europe, they declined by 13.3 per cent and 16.4 per cent respectively, to an annual average of US$ 49.35 per m.t.u., in the United States. The European buyer of the material paid less for APT than his United States counterpart, although the price differential has begun to erode more recently.

64. In Western Europe, poorer economic conditions and the competitive offer by suppliers in an oversupplied market accentuated the decline of APT prices for most of 1992. There was an increasing overlap of APT prices with the price range of concentrates. As shown in figure 2, the average price of APT was virtually equal to or less than the average price of ores and concentrates. The market entered 1993 with the material being traded over a range of US$ 46-48 per m.t.u., which was completely overlapped by the upper part of the concentrate price range, with the top concentrate grades fetching higher prices than the best APT grades. This situation would have sounded incredible some years ago

Figure 2

EVOLUTION OF CONCENTRATE AND AMMONIUM PARATUNGSTATE PRICES



Source: Metal Bulletin.

when conversion costs for converting concentrates into ammonium paratungstate were estimated between US$ 25 and US$ 30 per m.t.u.[17] If such costs were subtracted, the tungsten content in the imported ammonium paratungstate cost less than US$ 20 per m.t.u. to Western European buyers, compared with a price of around US$ 38-40 for the lowest concentrate grades. Incredible as it was, the situation was to deteriorate further in the months to come.

65. By mid-year 1993, APT prices in Western Europe had fallen to between US$ 34 and US$ 39 per m.t.u., down by 25.5 per cent since the end of the previous year. Further falls brought prices to a range between US$ 32 and US$ 38 per m.t.u., where the material was traded until the end of the year. If conversion costs were subtracted from the latter prices, the tungsten content in the imported ammonium paratungstate would appear to cost virtually nothing to the buyer.

66. As 1994 began, there was a slight change in the market situation as some large buyers started to look for material. However, the price improvement affected mainly lower APT grades. Prices ranged between US$ 34 and US$ 38 per m.t.u., and rose further to between US$ 37 and US$ 40 per m.t.u. by the end of the first quarter. A firmer market in the second quarter brought successive price increases and APT was fetching between US$ 49 and US$ 52 per m.t.u. in the Western European market at the time of writing.

67. In the United States, APT prices also dropped sharply but less heavily than in Western Europe. APT prices ended 1992 at between US$ 62 and US$ 71 per m.t.u. Unrelenting competition between suppliers who seemed to care more about the volume of sales than earnings drove down prices to between US$ 55 and US$ 61 per m.t.u. at the end of the first quarter and between US$ 51 and US$ 57 per m.t.u. at the end of the second quarter of 1993. In the face of an increasingly saturated market, the price fall accelerated further, bringing down APT prices to US$ 42 and US$ 55 per m.t.u. at the end of the third quarter of 1993.

68. Despite the turnaround in demand as the United States economy entered 1994, APT prices remained stagnant; in fact price conditions deteriorated in the first quarter of the year. Continued stronger performance of the economy led to some price increases in the second quarter, but the abundant availability of material limited price improvements, which were more modest than in Western Europe. APT was traded at between US$ 45 and US$ 50 per m.t.u. in the United States in may 1994, a price range which rose to between US$ 54 and US$ 60 per m.t.u. towards the end of the second quarter of 1994 (at the time of writing).

69. Sharp price decreases occurred also in the ferro-tungsten market in 1993. The material was traded at between US$ 4.50 and US$ 4.80 per kg at the beginning of the year, which was equivalent to a price in metal content of between US$ 36.00 to US$ 38.40 per m.t.u.,[18] compared to an m.t.u. price of between US$ 40.00 and US$ 50.00 for concentrates and between US$ 43.00 and US$ 48.00 for ammonium paratungstate. Ferro-tungsten prices slid virtually non-stop during the year, which brought the price range to between US$ 3.40 and US$ 3.70 per kg at the end

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[17] The figures refer to estimated conversion costs in a developed market-economy country (see Proceedings of the Third International Tungsten Symposium, Madrid, May 1985, pages 183 to 191).

[18] Calculated on the basis of an average tungsten content of 80 per cent in the ferro-tungsten.

of the year. The average ferro-tungsten price in 1993 was US$ 4.04 per kg, down by 22.3 per cent after the decrease of 14.8 per cent in 1992. In 1994, low prices persisted up to the second quarter, with the material on offer between US$ 3.60 and US$ 3.75 per kg. However, there was an upturn more recently following firmer prices for other tungsten materials, and the material was being traded at between US$ 3.90 and US$ 4.10 per kg at the time of writing.

VI. THE OUTLOOK IN THE TUNGSTEN MARKET

70. As shown in the foregoing paragraphs, recent production cutbacks have led to a shortfall of mine production in relation to tungsten consumption. However, this shortfall has not led to shortage in the market. Demand is still affected by the recession in major parts of the market, which has seriously afflicted tungsten-consuming industries recently. Nonetheless, the shortfall allows for a progressive absorption of surplus materials held in stock.

71. Prospects in the tungsten market will depend on the ability to maintain a better balance between demand and supply so as to allow for a further absorption of surplus materials. Failure to maintain such a balance would lead to a situation which has been too familiar in the tungsten market in past years when improved demand conditions were accompanied by an abundant supply of material with disastrous consequences for market prices.

72. On the demand side, prospects are improving with the strengthening in the performance of the world economy, which is now (July 1994) expected to grow more strongly in 1994 than most earlier forecasts had anticipated. The United States has achieved strong economic growth recently, although growth is more modest in several other major economies, including France, Germany and Japan. Growth rates remain strong in western Pacific-Rim and southern Asian countries and several Latin American countries. It is expected that the stronger performance of the world economy will generate substantial increases in tungsten demand, as happened in 1984-1985 and 1988-1989. However, the recovery in the tungsten market will be limited by the continued disarray of demand in Central and Eastern Europe and CIS countries.

73. On the supply side, the tungsten market has hitherto faced an abundant supply of material which drove tungsten prices to their lowest levels in 1992-1993. There are, however, indications that the situation may start to change. If recent trends continue, the market is offered the prospect of greater balance between demand and supply once the material in stock is absorbed.

74. A sustained recovery of demand will relieve the threat of closure on mine operation and benefit mine production in both developed market economy countries and developing countries. Some turnaround in their mine production can be expected from its current low level as some of their closed-down mines which were placed on a care-and-maintenance basis are re-opened. But the re-opening of closed-down mines will remain limited unless there is a substantial price improvement, which does not seem to be imminent. The re-opening is more difficult for mines which have remained closed for a long time, as is the case for most closed-down mines in the developed market-economy countries.

75. Future supply will, however, greatly depend on China, which remains the dominant supplier despite recent production cutbacks. Although the availability of Chinese material for export, particularly intermediate products, still seems to be plentiful, Chinese shipments are reported to be coming mostly from stock material. In the coming years, it is likely that mine production in China will be more constrained as its tungsten industry will have to respond more to market

forces and be content with less government support in the form of either subsidies or guaranteed prices. The continued introduction of market-economy principles in China would suggest that the response of supply would sooner rather than later have to take into account ore grades, energy costs and environmental concerns, in short to be more price-driven. Once stocks are exhausted, it is unlikely that supply from China would show the same degree of response to future demand upturns as it did, for example, during 1988-1989, when increased demand was accompanied by sharp increases in supply rather than by price increases.

76. Some supply may be forthcoming from CIS countries, particularly the Russian Federation, which is reported to hold most of the former USSR stockpile material. The Russian Federation was recently granted most-favoured-nation (MFN) status and has been strengthening its marketing networks abroad. However, the Russian tungsten industry also faces serious difficulties, including heavy cutbacks in mine production, weak market prices, decline in investment and a deterioration of mining infrastructure. This situation would be unlikely to improve greatly unless tungsten prices show substantial increases.

77. In conclusion, the recent shortfall in world mine production in relation to demand has led to an absorption of stock material. If world economic conditions continue to strengthen as indicated by recent forecasts, they would benefit tungsten prices and the tungsten industry. If, however, tungsten consumption increases sharply once stock material is exhausted, the tungsten market could face serious shortages.

Annex I

Economic growth rates and forecasts in selected countries, 1984-1994 a/

Country/region	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Forecast 1994
World economy	4.5	3.3	3.0	3.4	4.3	3.1	1.7	-0.3	1.4	1.5	3.3
Developed market-economy countries	4.6	3.2	2.6	3.1	4.3	3.2	2.0	0.4	1.7	1.2	2.5
Canada	6.4	4.7	3.3	4.1	5.0	2.3	-0.6	-1.8	0.7	2.4	...
France	1.5	1.8	2.4	2.2	4.3	3.8	2.2	1.1	1.4	-1.0	2.3
Germany b/	2.8	2.0	2.3	1.4	3.5	4.0	4.9	3.6	2.1	-2.0	1.5
Italy	2.7	2.6	2.9	3.1	4.1	2.9	2.2	1.4	0.9	0.7	...
Japan	4.3	5.0	2.6	4.1	6.2	4.7	5.2	4.4	1.3	0.0	0.7
United Kingdom	2.3	3.7	4.1	4.8	4.3	2.1	0.5	-2.2	-0.6	1.9	2.5
United States of America	6.1	3.0	2.6	3.0	3.9	2.6	0.7	-1.3	2.6	3.0	3.1
Developing countries	3.2	3.3	3.6	3.8	3.4	3.6	3.1	3.1	5.1	6.1	5.5
Brazil	5.1	8.0	7.4	3.6	-0.1	3.3	-4.1	1.2	-0.2	5.0	4.0
India	3.7	6.2	4.8	4.7	9.8	6.0	5.5	3.5	3.3	3.8	4.8
Republic of Korea	9.4	6.9	12.4	12.0	11.5	6.2	9.2	8.4	7.5	5.6	6.7
Mexico	3.6	2.6	-3.8	1.9	1.5	3.2	4.0	4.0	2.8	...	...
Thailand	7.1	3.5	4.9	9.5	13.2	12.0	10.0	8.0	7.5	7.8	8.2
China c/	14.6	12.7	8.3	11.0	11.3	3.6	4.8	6.6	12.8	13.4	10.0
CIS (ex-USSR) d/	2.9	1.6	2.3	1.6	4.4	2.3	-3.4	-12.2	-19.9	-13.0	-6.0

Source: Handbook of International Trade and Development Statistics, UNCTAD, recent issues; World Economic Survey, United Nations (New York), recent issues; World Economic Outlook, IMF, recent issues; Main Economic Indicators, OECD, recent issues.

a/ Rates refer to real gross domestic product or gross national product, unless otherwise specified.

b/ Not including East Germany. Figures for Germany prior to 3 October 1990 are indicated separately for the Federal Republic of Germany and the former German Democratic Republic.

c/ National income.

d/ Net national product.

Annex II

World consumption, production and trade of tungsten ores and concentrates by region 1985-1993

(Metric tons of tungsten content)

	1985	1986	1987	1988	1989	1990	1991	1992	1993
A. World consumption	52 968	50 956	51 382	55 220	58 049	49 566	40 928	36 630	32 697
Developed market-economy countries	17 112	13 636	14 243	15 900	15 231	11 302	10 351	7 490	5 857
Developing countries	3 453	2 956	3 195	2 596	2 968	2 564	2 167	1 830	530
Countries of Eastern Europe	(17 403)	(18 064)	(17 444)	(14 224)	(14 350)	(12 200)	(8 410)	(7 310)	(6 310)
Socialist countries of Asia	(15 000)	(16 300)	(16 500)	(22 500)	(25 500)	(23 500)	(20 000)	(20 000)	(20 000)
B. World production	56 241	54 767	48 492	56 445	60 426	48 878	37 670	34 393	30 286
Developed market-economy countries	11 390	9 030	4 323	5 177	5 106	4 727	2 986	3 230	1 199
Developing countries	8 301	6 687	5 619	5 418	5 470	4 301	4 034	2 813	1 737
Countries of Eastern Europe	(10 050)	(9 050)	(9 050)	(8 050)	(7 050)	(7 050)	(7 050)	(6 250)	(5 750)
Socialist countries of Asia	(26 500)	(30 000)	(29 500)	(37 800)	(42 800)	(32 800)	(23 600)	(22 100)	(21 600)
C. World imports	25 136	20 899	19 889	23 594	23 645	18 763	14 364	6 354	3 287
Developed market-economy countries	13 053	8 937	9 794	13 997	13 489	10 054	9 602	3 578	2 427
Developing countries	3 230	2 948	1 651	1 373	2 836	2 509	2 302	1 766	300
Countries of Eastern Europe	(8 853)	(9 014)	(8 444)	(8 224)	(7 320)	(6 200)	(2 460)	(1 010)	(560)
D. World Exports	26 592	23 392	22 017	23 360	25 467	16 544	11 470	6 403	3 285
Developed market-economy countries	7 893	4 833	3 137	3 758	2 978	2 707	2 696	1 297	520
Developing countries	6 747	5 394	5 975	4 248	5 275	4 565	5 047	3 308	1 805
Socialist countries of Asia	11 952	13 165	12 905	15 354	17 214	9 272	3 727	1 798	960

Source: Tungsten Statistics, UNCTAD quarterly and annual bulletins, recent issues.

( ) Denotes estimates.

Annex III

Movements of tungsten stocks by type in selected countries, 1984-1993
(Metric tons of tungsten content)
End of year

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
A. Ores and concentrates										
Producers' stocks										
Australia	306	379	481	435	416	705	717	431	(424)	431
Bolivia	a/	a/	a/	a/	105	130	(210)	(200)	(100)	
Brazil	17	17	875	a/	70	84	-	-	-	-
France	76	85	205	55	-	-	-	-	-	-
India	32	54	50	50	57	10	11	13	(10)	(10)
Japan	39	27	26	21	41	72	75	101	(207)	(79)
Mexico	18	20	95	8	19	13	25	18	86	86
Peru	a/	46	241	a/	71	(54)	-	-	-	
Portugal	251	305	1,042	941	970	1,057	1,180	634	709	500
Republic of Korea	231	200	44	45	(45)	-	-	-	-	-
Rwanda	48	a/	(60)	10	10	10	22	-	-	
Spain	114	84	50	62	47	45	20	-	-	
Sweden	-	-	-	-	-	206	-	-	-	
Thailand	804	1,029	1,025	1,100	1,295	1,487	1,553	1,617	(1,684)	(1,700)
Turkey	96	80	145	43	20	-	-	-	-	-
United States of America	46	60	21	21	21	(10)	16	26	(10)	(10)
Sub-total	2,078	2,386	4,360	2,801	3,187	3,883	3,829	3,040	3,230	2,816
Consumers' stocks										
Canada	a/	a/	a/	255	75	70	61	53	-	-
France	177	130	221	-	-	-	-	-	-	-
Japan	557	671	687	448	455	561	860	661	678	400
Republic of Korea	-	-	-	-	-	-	-	200	300	200
Portugal	13	10	1	-	1	1	1	(1)	-	-
Sweden	256	302	333	353	301	218	40	40	22	-
United States of America	959	1,077	502	329	499	1,261	1,077	1,778	702	592
Sub-total	1,952	2,190	1,744	1,385	1,331	2,111	2,039	2,733	1,702	1,192
Dealers' stocks										
Argentina	9	9	-	-	-	-	-	-	-	-
Japan	-	1	-	-	-	-	-	-	-	-
Peru	a/	a/	a/	a/	7	7	27	27	-	-
Thailand	339	113	116	120	51	107	83	26	30	-
Sub-total	348	123	116	120	58	114	110	53	30	-
Total (As shown above)	4,378	4,699	6,220	4,306	4,576	6,108	5,978	5,826	4,962	4,008
B. Ammonium paratungstate										
Bolivia	-	513	389	27	159	179	237	276	(250)	-
Republic of Korea	157	170	226	189	219	219	200	250	(90)	(55) c/
Sweden	-	76	318	126	306	467	340	332	420	264
United States of America b/	1,191	1,056	477	292	911	915	896	578	333	420
Total (As shown above)	1,348	1,815	1,410	634	1,595	1,780	1,673	1,436	1,093	739

Source: Tungsten Statistics, UNCTAD, quarterly and annual bulletins, recent issues, and the Bureau of Mines, the United States Department of the Interior.

- Denotes negligible or nil. a/ Not available. ( ) Denotes provisional estimates.

b/ Consumers' and producers' stocks only.

c/ Includes tungsten oxides.